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Knowledge and Awareness of Practices Regarding Correct Posture During Studying among Medical Students in KSA

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Abstract: **Introduction:** Poor posture is one of the primary risk factors for musculoskeletal discomfort. Incorrect spinal alignment and prolonged shoulder flexion can be uncomfortable and even harmful. As future healthcare professionals, understanding the impact of good posture on back pain is crucial. Good posture ensures optimal alignment of the body's structures, preventing musculoskeletal imbalances and discomfort. By educating patients and promoting healthy postural habits, medical professionals can play a vital role in effectively managing back pain. **Objectives:** To assess the knowledge and awareness of the correct posture while studying among students in KSA. **Method:** This cross-sectional study was conducted in the Kingdom of Saudi Arabia. Convenience sampling techniques were used to recruit a representative sample of medical students from various educational institutions. The inclusion criteria included Saudi Arabian medical students of all levels and genders, as well as full-time enrollment. Exclusion criteria consisted of non-consenting participants, medical professionals, individuals with physical impairments, non-Saudi nationals, and part-time students. The data was collected using Microsoft Office Excel and analyzed using SPSS software. **Results:** This was a cross-sectional study of 288 medical students (mean age = 22.7 years; 65.6% female) in Saudi Arabia. Over half (52.8%) studied >5 hours daily, with 74.3% reporting pain, predominantly back pain (84.7%). Notably, 60.8% demonstrated a commendable posture knowledge level; female students, those aged 23, and higher academic years had better knowledge ($p<0.05$). Awareness correlated with academic performance and time spent studying. 83.3% recognized sitting as correct posture. Most (92.7%) believed that correct posture prevents musculoskeletal issues, and 49.3% advocated for including ergonomics in the curriculum, underscoring the need for targeted educational interventions to address posture-related musculoskeletal risks. **Conclusion:** This study highlights both the promising levels of awareness among Saudi medical students regarding the importance of correct posture and the significant prevalence of musculoskeletal pain linked to prolonged study routines. The findings emphasize the urgent need for educational reforms and personalized ergonomic interventions to mitigate health risks.

Key Words Saudi Arabia, Knowledge, Awareness, Medical Student, Posture, Musculoskeletal, Physiotherapy, Ergonomics, Healthcare Practitioners, Healthy Lifestyle

INTRODUCTION

Bad posture is a significant risk factor for musculoskeletal pain among medical professionals. Prolonged shoulder flexion and improper spinal alignment can lead to discomfort and potential injuries. Poor workstation setup and prolonged standing or sitting can further contribute to the development of musculoskeletal pain. Healthcare practitioners should prioritize good posture and ergonomics to mitigate these risks and maintain their well-being throughout their careers [1]. As confirmed by multiple reports, sedentary lifestyles and poor sitting posture are on the rise, leading to musculoskeletal pain and significant health implications [2]. The global impact of the COVID-19 pandemic has been profound, particularly on teaching and learning practices. This mode of education is expected to continue until early 2021, potentially posing health and physiological challenges for university students [3]. Having a physiotherapist in the school setting promotes the development of healthy postural

habits. Following the program, all adolescents reported reduced back pain [4].

The relationship between knowledge and attitude toward ergonomic sitting position, sitting duration, and posture among medical students was examined. The results showed that 23.3% of participants had good knowledge, 40% had adequate knowledge, and 56.7% had a positive attitude towards ergonomic sitting positions. Furthermore, 60% of participants spent more than 8 hours a day sitting, and 43.3% maintained a straight sitting posture [5]. Tavakkol et al. conducted a study to assess the prevalence of low back pain among operating room personnel and its association with their awareness of risk factors. The findings revealed that the prevalence of low back pain was 74% among the personnel. However, no significant relationship was found between the prevalence of low back pain and the personnel's awareness of risk factors. This highlights the significance of addressing low back pain in the operating room setting [6]. Furthermore, it is advisable to implement early diagnostic survey programs as a preventive measure against long-lasting pain in adulthood. It is recommended that future research focus on evaluating the impact of school ergonomics and furniture designed to provide comprehensive support for the body, aiming to prevent musculoskeletal pain. To assist adolescents in managing musculoskeletal pain and promoting a healthy lifestyle, school nurses should develop and execute structured health education programs. These programs should address various aspects, such as proper coping strategies for musculoskeletal pain and the adoption of healthy habits [7].

Relevant studies show that medical students experience stress and perceive knowledge gaps during their academic journey [8,9]. These studies suggest a potential lack of emphasis on correct posture during medical education. Further research is needed in Saudi Arabia to identify strategies to assess awareness of proper posture among medical students.

Objectives

Primary Objective: To assess the knowledge and awareness of the correct posture while studying among students in KSA.

Secondary Objective

- To identify the relationship between knowledge of practices regarding correct posture during studying among medical students and sociodemographic characteristics
- To establish awareness of practices regarding correct posture during studying among medical students in association with sociodemographic characteristics

Materials and Methods

This cross-sectional study was conducted in the Kingdom of Saudi Arabia. The target population for this study is medical students. The research was shared and advertised through online posters, online study groups, social media, and any common areas frequented by medical students. Interested students can then voluntarily participate in the study. The research team use a combination of convenience sampling to ensure a representative sample.

Inclusion and Exclusion Criteria

Participants must be currently enrolled in medical colleges as medical students, encompassing all years of medical school, including both pre-clinical and clinical years. The study aims to include both male and female participants, allowing for a diverse representation of genders. It is imperative that participants willingly provide informed consent to participate in the study, ensuring their autonomy and understanding of the research objectives. The study specifically targets full-time medical students who are not employed, as this criterion helps to focus on individuals whose primary commitment is their medical education. Finally, the study is limited to Saudi Arabian nationals, aiming to gather data from this specific demographic group.

Individuals who are unwilling or unable to provide informed consent, graduated medical professionals, such as doctors, residents, or fellows, participants with physical impairments or medical conditions that may affect their posture or ability to adhere to proper posture guidelines, Non-Saudi Arabian nationals, part-time or distance-learning medical students and individuals who are not enrolled in medical programs, including students from other healthcare disciplines was excluded from the study. These exclusion criteria are put in place to ensure the homogeneity and relevance of the participant population for the specific objectives of the study.

Method For Data Collection and Instrument (Data Collection Technique and Tools)

A structured questionnaire was utilized as the study tool. This tool has been developed based on relevant studies conducted in Saudi Arabia. The final version of the questionnaire consists of 12 questions, categorized into two main sections. The first section includes questions about participants' knowledge and background characteristics. The second section focuses on the importance of correct posture in ergonomics and the need to include related courses in the medical curriculum. The survey instrument was a self-administered, anonymous questionnaire in English. It was comprised of questions aimed at assessing participants' knowledge and awareness of the correct sitting position, duration of sitting, health disorders associated with prolonged sitting, and the importance of posture for medical students. This instrument has been previously used among health students in Saudi Arabia. Data collection was conducted through participants' responses to the questionnaire. The questionnaire gathered information on demographic factors such as age, gender, and specialty. Participants were asked about their average daily sitting duration, preferred sitting location, and usual sitting position.

Scoring System

Knowledge Score: Promoted responses of general knowledge about good posture were considered for calculating the knowledge score. Each respondent was asked 6 questions that could be answered with a yes or no, and a score of 1 was given for a 'yes' answer. There was no negative marking for 'no. The maximum possible score for the knowledge part was 6x1 = 6.

Awareness Score

Each respondent was asked a 6-item questionnaire related to their awareness of the right posture. Responses were recorded as strongly agree, disagree, somewhat agree, somewhat disagree, don't know, or can't say. Depending on the level of awareness, scores ranging from 0 to 5 were allotted. A score of '0' was given for don't know or can't say responses. Similarly, the maximum possible score for the awareness section was 6x5 = 30.

The participants were classified based on their scores in the knowledge section, resulting in the formation of three distinct groups. Those who achieved a score of 6 were categorized as possessing a commendable level of knowledge, while those who scored 4–5were classified as having a moderate level of knowledge. Lastly, individuals who scored 3 or lower were designated as having a comparatively limited level of knowledge. The participants were categorized into three distinct groups during the awareness phase, as determined by their scores. Those who achieved a score between 26 and 30 were recognized as having excellent awareness. Participants scoring between 21 and 25 were acknowledged as having moderate knowledge, while individuals scoring 20 or below were identified as having limited awareness.

Analysis and Entry Method

The data was initially entered into a computer using Microsoft Office Excel Software, specifically the 2016 version for Windows. Subsequently, the data was transferred to the Statistical Package for the Social Sciences (SPSS) software. The specific version used for analysis was IBM SPSS Statistics for Windows, Version 20.0, developed by IBM Corp. This software was utilized to conduct the statistical analysis of the data. In this study, both descriptive statistics and the chi-square test were used.

RESULTS

Table 1 displays various demographic parameters of the participants with a total number of 288. The participant sample consists of participants with a mean age of 22.7 years, and 46.2% of the participants are under the age of 22. A statistical analysis reveals that women (65.6%) make up most of the research participants because of an apparent gender disparity that could impact the study results. The Southern Region dominates participant enrollment, but both the Northern and Eastern Regions exhibit insufficient participation, because of which the findings may lack wider geographical applicability. Most participants reside in families that earn more than 15000 SR per month because 68.8% of respondents fall within this category, demonstrating an upper-class family background. This group demonstrates excellent academic performance because 43.4% of students maintain a Very Good GPA rating.

Figure 1 shows important findings regarding the study time habits of the entire 288 participant group. Among the entire 288-person sample, only 14 individuals studied for less than an hour daily, constituting 4.9% of the group. The research data indicates that 152 participants, composing 52.8% of the study body, spend longer than five hours daily in academic studying activities. The study duration of four to five hours per day was indicated by 81 participants, which represented a total of 28.1% of the respondents. Fifty-two percent of the participants engaged in their studies for more than five hours a day, whereas 14.2% distributed their study time across one to three hours daily.

Table 2 in the research article presents detailed findings regarding medical students' understanding and behavior patterns for proper studying posture, together with critical patterns and challenges. The study duration of more than five hours per day was reported by a significant number of respondents (52.8%), thus prompting concerns about long-term effects on musculoskeletal health. The study demonstrates a key problem in this demographic since 74.3% of students suffered pain after their academic work. This research shows that back pain stands out as the most prevalent condition since it affects 84.7% of respondents, with neck and shoulder pain ranking second, indicating potential poor alignment of existing study postures to ergonomic standards. Almost all (96.9%) participants from the study observed musculoskeletal disorders, yet 92.7% understood that proper posture serves as a protective measure against such health problems.

As shown in Figure 2, The demographic figure illustrates how 288 study participants detected the connection between bad posture and musculoskeletal issues. 144 individuals who make up 50% of the sample showed strong agreement toward the statement positioning them as particularly aware of this matter. A substantial 41.7% of participants joined 120 others to accept the link between posture and musculoskeletal health based on their responses. A minority portion of survey participants displayed ambiguity regarding this statement since 21 individuals (7.3%) were undecided, but 3 respondents (1.0%) disagreed with it.

Table 3 in the research article reveals powerful information about medical students' recognition and opinion levels regarding posture and ergonomics in their studies. Study participants demonstrated strong agreement about their familiarity with risky musculoskeletal injuries from improper posture because 50.0% strongly agreed while 58.3% stated correct posture was essential. The results demonstrate that medical students possess a well-developed understanding of posture impacts on health since their academic workload represents a high level of challenge. The medical curriculum should include ergonomics courses according to 49.3% of students who participated in the study.

Table 1: Sociodemographic Characteristics of Participants (N=288)

Parameter		No.	Percentage
Age (Mean: 22.7, STD:1.6)	22 or less	133	46.2
	23 years old	93	32.3
	24 or more	62	21.5
Gender	Female	189	65.6
	Male	99	34.4
Region of residence	Northern Region	14	4.9
	Southern Region	131	45.5
	Central Region	77	26.7
	Eastern Region	13	4.5
	Western Region	53	18.4
Monthly family income	Less than 5000	12	4.2
	5000 – 10000	18	6.3
	10001 – 15000	60	20.8
	More than 15000	198	68.8
Academic year	2	6	2.1
	3	23	8.0
	4	63	21.9
	5	102	35.4
	6	59	20.5
	Intern	35	12.2
Current GPA	Excellent (at least 3.50 out of 4.00 or (at least 4.50 out of 5.00)	92	31.9
	Very good (2.75 to 3.49 out of 4.00) or (3.75 to 4.49 out of 5.00)	125	43.4
	Good (1.75 to 2.74 out of 4.00) or (2,75 to 3.74 out of 5.00)	64	22.2
	Satisfactory (1.00 to 1.74 out of 4.00) or (2.00 to 2.74 out of 5.00)	7	2.4

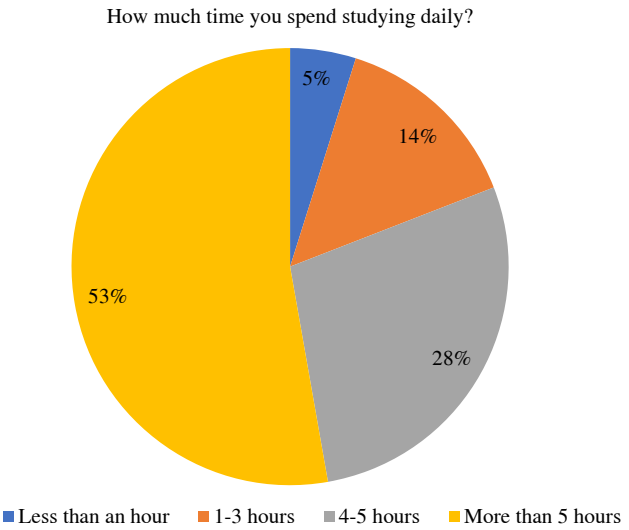

Figure 1: Time of Daily Studying Among Participants

Table 4 shows medical students' understanding about proper study postures. Survey results show that students who hold an acceptable level of knowledge about ergonomics take up 60.8% of the sample which represents a substantial portion of the total participants. A large number of students (78.5% and 7.3%) show moderate to low levels of awareness about correct posture, according to the results released by the research article.

Table 5 shows that medical students display mainly positive understanding about correct posture practices during their studies, according to the presented data. A substantial number of 61.5% respondents had expert knowledge about proper posture advantages thus showing their understanding of how correct posture prevents musculoskeletal problems during study hours. Additionally, a large proportion of 32.3% of participants showed moderate understanding of postural health although they still had room to develop their knowledge base. Educational strategies should focus on the 6.3% population segment, which demonstrates minimal understanding because it represents an essential educational need.

Table 6 shows that knowledge of practices regarding correct posture during studying has statistically significant relation to gender (p value = 0.010), age (p value = 0.0001), monthly family income (p value = 0.0001), academic year (P value=0.0001), time spent studying daily (p value = 0.003), and usual posture during studying (p value = 0.001). It also shows statistically insignificant relation to region of residence, and current GPA. Participants of female gender, aged 23 years old, with a monthly income of more than 15000

Table 2: Parameters Related to Knowledge of Practices Regarding Correct Posture During Studying Among Medical Students (N = 288).

Parameter		No.	Percentage
How much time did you spend studying daily?	Less than an hour	14	4.9
	1-3 hours	41	14.2
	4-5 hours	81	28.1
	More than 5 hours	152	52.8
What is your usual posture while studying?	Sitting at a desk	222	77.1
	Sitting on bed	27	9.4
	Lying down	31	10.8
	Other	8	2.8
Do you experience any pain or physical discomfort after studying?	Yes	214	74.3
	No	11	3.8
	Sometimes	63	21.9
If you experience pain after studying, where do you usually feel it?*	Neck	202	70.1
	Back	244	84.7
	Shoulders	107	37.2
	Arms/hands	127	44.1
	Other	35	12.2
How much pain do you feel in the neck after studying?	0	67	23.3
	1	78	27.1
	2	143	49.7
How much pain do you feel in the back after studying?	0	29	10.1
	1	71	24.7
	2	188	65.3
How much pain do you feel in the shoulders after studying?	0	157	54.5
	1	74	25.7
	2	57	19.8
How much pain do you feel in the arms after studying?	0	178	61.8
	1	74	25.7
	2	36	12.5
How much pain do you feel in the hands after studying?	0	151	52.4
	1	74	25.7
	2	63	21.9
Musculoskeletal disorders/problems include disorders of the muscles, bones, tendons, ligaments, and joints	No	9	3.1
	Yes	279	96.9
Sitting too long with the correct posture can prevent musculoskeletal disorders	No	21	7.3
	Yes	267	92.7
The correct sitting position when the forearm lies on the table or is supported	No	15	5.2
	Yes	273	94.8
Sitting too much can cause musculoskeletal disorders	No	12	4.2
	Yes	276	95.8
Upright posture while sitting is the only correct posture	No	48	16.7
	Yes	240	83.3

*Results may overlap

SAR, in the fifth academic year, and studying more than 5 hours daily were found to have higher knowledge level than others.

Table 7 shows that awareness of practices regarding correct posture during studying has a statistically significant relation to academic year (p value = 0.027), current GPA (p value = 0.001), and time of daily studying (p value = 0.026). It also shows a statistically insignificant relation to gender, age, region of residence, monthly family income, and usual posture during studying. Participants who are in the fifth academic year, have excellent GPAs, and spend more than 5 hours studying daily had better awareness levels than others.

DISCUSSION

The problems related to medical students' knowledge and understanding of posture have progressively gained importance over the last few years. A cross-sectional study investigated medical students' knowledge and perception of proper studying postures in educational institutions throughout the Kingdom of Saudi Arabia. This research showed that the relationship between study time length and self-reported ergonomics familiarity leads to an increased incidence of academic-related musculoskeletal discomfort in students. Previous research supports this study by demonstrating a high incidence of musculoskeletal disorders, which affects students who spend numerous hours studying from multiple postures.

The research shows that medical students demonstrate good comprehension of ergonomic postural practices since 60.8% of them exhibit this capability. Although awareness about posture stands high at 60.8%, 74.3% of respondents admit to experiencing discomfort and lower back pains activate as the leading discomfort reported among 84.7% of respondents. The reported statistics that show pain prevalence match previously published research such as Hasan *et al.* [11], who documented 88.5% of undergraduate students experiencing musculoskeletal pain problems

Table 3: Participants' Awareness of Practices Regarding Correct Posture During Studying Among Medical Students (N = 288).

Parameter		No.	Percent (%)
I'm familiar with the potential musculoskeletal risks associated with poor posture	Strongly agree	144	50.0
	Agree	120	41.7
	Undecided	21	7.3
	Disagree	3	1.0
Ergonomics (Efficient design to sit) and maintaining correct posture are crucial to me during studying	Strongly agree	168	58.3
	Agree	93	32.3
	Undecided	27	9.4
Ergonomics (Efficient design to sit) courses should be included in the medical curriculum	Strongly agree	142	49.3
	Agree	116	40.3
	Undecided	24	8.3
	Disagree	3	1.0
	Strongly disagree	3	1.0
I am interested in learning about ergonomics (Efficient design to sit)	Strongly agree	161	55.9
	Agree	97	33.7
	Undecided	27	9.4
	Disagree	3	1.0
I am confident in my ability to identify poor posture habits	Strongly agree	140	48.6
	Agree	121	42.0
	Undecided	15	5.2
	Disagree	6	2.1
	Strongly disagree	6	2.1
Correct posture positively impacts overall well-being	Strongly agree	155	53.8
	Agree	103	35.8
	Undecided	27	9.4
	Strongly disagree	3	1.0

Table 4: Shows Knowledge of Practices Regarding Correct Posture During Studying Among Medical Students, Score Results.

Parameters	Frequency	Percent
Commendable level of knowledge	175	60.8
Moderate knowledge level	92	31.9
Low knowledge level	21	7.3
Total	288	100.0

Table 5: Shows Awareness of Practices Regarding Correct Posture During Studying Among Medical Students Score Results.

Parameters	Frequency	Percent
Excellent awareness	177	61.5
Moderate awareness	93	32.3
Limited awareness	18	6.3
Total	288	100.0

across different educational settings. Similar to Alnaimat *et al.* [12], the obtained comparative data showed that medical students commonly experience persistent bodily pain, so early intervention and ergonomics-focused healthcare curricula need to be developed.

Students who dedicated more than five hours to daily studying experienced higher rates of back and neck pain, as confirmed by results from Abumohssin *et al.* [13] and other studies. The prolonged study duration intensified their discomfort due to improper sitting positions. Research shows that musculoskeletal complaints affect a large number of students who study intensively [14] while confirming the widespread occurrence of these complaints during this period. The collected data shows that students who have better posture understanding tend to report more discomfort even though their enhanced knowledge does not fully lead to positive changes in their workspace behavior.

Females exhibited better scores in ergonomic knowledge than males among university students, according to the statistical data ($p \leq 0.05$). According to Wijnhoven *et al.* [15], studies demonstrate that females suffer from musculoskeletal disorders at a higher rate than males. The review conducted by Alshagga *et al.* [16] demonstrated higher incidence rates of pain in medical students, with special attention to academic pressure along with study-related behaviors as contributing risk factors. Medical education needs to explicitly address the way women report pain differently because it remains important for current and future curricula and ergonomic consultations directed at students.

The study data shows Southern Region respondents make up most of the participants at a time when economic disparities show through family income levels, thus affecting access to ergonomic resources. The literature supports that socioeconomic status shapes health outcomes, especially regarding school bag-induced musculoskeletal pain, according to Kanjilal *et al.* [17]. The educational and ergonomic resources for students in Saudi Arabia appear more accessible to those students who have a monthly family income exceeding 15,000 SAR. The importance of

Table 6: Relation Between Knowledge of Practices Regarding Correct Posture During Studying Among Medical Students and Sociodemographic Characteristics

Parameters		Knowledge level		Total (N = 288)	p-value*
		Commendable level of knowledge	Moderate or low knowledge level		
Gender	Female	125	64	189	0.010
		71.4%	56.6%	65.6%	
	Male	50	49	99	
		28.6%	43.4%	34.4%	
Age	22 or less	69	64	133	0.0001
		39.4%	56.6%	46.2%	
	23 years old	72	21	93	
		41.1%	18.6%	32.3%	
	24 or more	34	28	62	
		19.4%	24.8%	21.5%	
Region of residence	North Region	5	9	14	0.068
		2.9%	8.0%	4.9%	
	Southern Region	86	45	131	
		49.1%	39.8%	45.5%	
	Central Region	44	33	77	
		25.1%	29.2%	26.7%	
	Eastern Region	5	8	13	
		2.9%	7.1%	4.5%	
	Western Region	35	18	53	
		20.0%	15.9%	18.4%	
Monthly family income in SAR	Less than 5000	3	9	12	0.0001
		1.7%	8.0%	4.2%	
	5000 - 10000	0	18	18	
		0.0%	15.9%	6.3%	
	10001 - 15000	36	24	60	
		20.6%	21.2%	20.8%	
	More than 15000	136	62	198	
		77.7%	54.9%	68.8%	
Academic year	2	0	6	6	0.0001
		0.0%	5.3%	2.1%	
	3	5	18	23	
		2.9%	15.9%	8.0%	
	4	32	31	63	
		18.3%	27.4%	21.9%	
	5	73	29	102	
		41.7%	25.7%	35.4%	
	6	45	14	59	
		25.7%	12.4%	20.5%	
	Intern	20	15	35	
		11.4%	13.3%	12.2%	
Current GPA	Excellent	62	30	92	0.067
		35.4%	26.5%	31.9%	
	Very good	65	60	125	
		37.1%	53.1%	43.4%	
	Good	43	21	64	
		24.6%	18.6%	22.2%	
	Satisfactory	5	2	7	
		2.9%	1.8%	2.4%	
How much time do you spend studying daily?	Less than an hour	3	11	14	0.003
		1.7%	9.7%	4.9%	
	1-3 hours	20	21	41	
		11.4%	18.6%	14.2%	
	4-5 hours	55	26	81	
		31.4%	23.0%	28.1%	
	More than 5 hours	97	55	152	
		55.4%	48.7%	52.8%	
What is your usual posture while studying?	Lying down	10	21	31	0.001
		5.7%	18.6%	10.8%	
	Sitting at a desk	141	81	222	
		80.6%	71.7%	77.1%	
	Sitting on the bed	21	6	27	
		12.0%	5.3%	9.4%	
	Other	3	5	8	
		1.7%	4.4%	2.8%	

*P value was considered significant if ≤ 0.05.

Table 7: Awareness of Practices Regarding Correct Posture During Studying Among Medical Students in Association with Sociodemographic Characteristics

Parameters		Awareness level		Total (N = 288)	p-value*
		Excellent awareness	Moderate or limited awareness		
Gender	Female	120	69	189	0.327
		67.8%	62.2%	65.6%	
	Male	57	42	99	
		32.2%	37.8%	34.4%	
Age	22 or less	78	55	133	0.573
		44.1%	49.5%	46.2%	
	23 years old	61	32	93	
		34.5%	28.8%	32.3%	
	24 or more	38	24	62	
		21.5%	21.6%	21.5%	
Region of residence	North Region	8	6	14	0.245
		4.5%	5.4%	4.9%	
	Southern Region	88	43	131	
		49.7%	38.7%	45.5%	
	Central Region	46	31	77	
		26.0%	27.9%	26.7%	
	Eastern Region	5	8	13	
		2.8%	7.2%	4.5%	
	Western Region	30	23	53	
		16.9%	20.7%	18.4%	
Monthly family income	Less than 5000	3	9	12	0.060
		1.7%	8.1%	4.2%	
	5000 - 10000	12	6	18	
		6.8%	5.4%	6.3%	
	10001 - 15000	36	24	60	
		20.3%	21.6%	20.8%	
	More than 15000	126	72	198	
		71.2%	64.9%	68.8%	
Academic year	2	0	6	6	0.027
		0.0%	5.4%	2.1%	
	3	11	12	23	
		6.2%	10.8%	8.0%	
	4	38	25	63	
		21.5%	22.5%	21.9%	
	5	67	35	102	
		37.9%	31.5%	35.4%	
	6	38	21	59	
		21.5%	18.9%	20.5%	
	Intern	23	12	35	
		13.0%	10.8%	12.2%	
Current GPA	Excellent	68	24	92	0.001
		38.4%	21.6%	31.9%	
	Very good	65	60	125	
		36.7%	54.1%	43.4%	
	Good	37	27	64	
		20.9%	24.3%	22.2%	
	Satisfactory	7	0	7	
		4.0%	0.0%	2.4%	
How much time do you spend studying daily?	Less than an hour	5	9	14	0.026
		2.8%	8.1%	4.9%	
	1-3 hours	20	21	41	
		11.3%	18.9%	14.2%	
	4-5 hours	49	32	81	
		27.7%	28.8%	28.1%	
	More than 5 hours	103	49	152	
		58.2%	44.1%	52.8%	
What is your usual posture while studying?	Lying down	13	18	31	0.127
		7.3%	16.2%	10.8%	
	Sitting at a desk	141	81	222	
		79.7%	73.0%	77.1%	
	Sitting on the bed	18	9	27	
		10.2%	8.1%	9.4%	
	Other	5	3	8	
		2.8%	2.7%	2.8%	

*P value was considered significant if ≤ 0.05.

ergonomics education stands clear, according to Khan and Chew [18], while this essential medical field remains poorly established.

Our study data demonstrates a considerable interest among medical students to incorporate ergonomics into curriculum education because 49.3% of respondents supported such integration. The requirement to improve medical education about musculoskeletal health matches previous recommendations from Gomes *et al.* [19] regarding student ergonomic learning requirements during remote education. The findings presented in Malmborg *et al.* [20] confirm that curriculum changes should focus on creating musculoskeletal pain prevention strategies because they affect academic performance and students' overall health status. Student awareness about the usefulness of this knowledge stands strong, yet academic establishments show minimal incorporation of such knowledge into their frameworks.

Limitations

The current study has notable restrictions that require special attention. This study uses 288 medical students as participants who create a strong analytical base, yet their geographic grouping reduces the potential for a universal conclusion. Self-reported data collection methods could introduce subjective interpretation errors that affect participants' ratings of discomfort and their sense of being aware of their posture. Future investigations should augment the research by combining long-term examination with standardized measurements for posture analysis as well as injury measurement methods. The obtained research data serves as base of knowledge, yet researchers must handle results with caution because further investigation about this matter should build upon this initial information.

CONCLUSIONS

The findings demonstrate that Saudi medical students show a promising understanding of postural correctness and exhibit high rates of musculoskeletal pain because of their extended study activities. These results show that educational reforms alongside personalized ergonomic solutions must be implemented as soon as possible because they would reduce health risks. Future research must bridge the gap between academic student knowledge about ergonomics and their actual implementation by studying appropriate medical education interventions and ergonomic integration effects on student health.

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Ethical approval

After fully explaining the study and emphasizing that participation was optional, each participant gave informed consent. The information gathered was safely stored and utilized exclusively for the study.

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Conflict of interests

The authors declare no conflict of interest.

Informed consent

Written informed consent was acquired from each study participant.

REFERENCES

[1] Kanaparthy, Rosaiah *et al.* "Postural awareness among dental students in jizan, Saudi Arabia." Journal of International Society of Preventive and Community Dentistry, vol. 5, no. 8, 2015, pp. 107-0. http://dx.doi.org/10.4103/2231-0762.172950.

[2] Szczygieł, Elżbieta *et al.* "Musculo-skeletal and pulmonary effects of sitting position – a systematic review." Annals of Agricultural and Environmental Medicine, vol. 24, no. 1, March 2017, pp. 8-12. http://dx.doi.org/10.5604/12321 966.1227647.

[3] Yousof, Shimaa *et al.* "Impacts of prolonged online learning practice during COVID-19 epidemic on body functions and wellbeing: A review article." Journal of Medical Science, vol. 90, no. 3, September 2021. http://dx.doi.org/10. 20883/medical.e522.

[4] Blanco-Morales, María *et al.* "Implementation of a classroom program of physiotherapy among spanish adolescents with back pain: A collaborative study." International Journal of Environmental Research and Public Health, vol. 17, no. 13, July 2020, pp. 4806-0. http://dx.doi.org/10.339 0/ijerph17134806.

[5] Sutanto, Gilbert Yavin *et al.* "The association between knowledge and attitude of ergonomic sitting position to sitting posture and duration among medical students." Journal of Urban Health Research, vol. 1, no. 2, April 2023, pp. 70-78. http://dx.doi.org/10.25170/juhr.v1i2.4088.

[6] Tavakkol, Reza *et al.* "Survey of awareness about the risk factors of low back pain among operating room personnel of shiraz hospitals: A cross-sectional study." Clinical Epidemiology and Global Health, vol. 8, no. 4, December 2020, pp. 1172-1176. http://dx.doi.org/10.1016/j.ceg h.2020.04.010.

[7] Ozdemir, Serpil *et al.* "Musculoskeletal pain, related factors, and posture profiles among adolescents: A cross-sectional study from Turkey." Pain Management Nursing, vol. 22, no. 4, August 2021, pp. 522-530. http://dx.doi.org/10.1016/j.pmn.2020.11.013.

[8] Bergmann, Christin *et al.* "Medical students' perceptions of stress due to academic studies and its interrelationships with other domains of life: A qualitative study." Medical Education Online, vol. 24, no. 1, January 2019, pp. 1603526-0. http://dx.doi.org/10.1080/10872981.2019.1603526.

[9] Park, Gyu Mi, and Ah Jeong Hong. ""not yet a doctor": Medical student learning experiences and development of professional identity." BMC Medical Education, vol. 22, no. 1, March 2022. http://dx.doi.org/10.1186/s12909-022-03209-w.

[10] Malau-Aduli, Bunmi S. *et al.* "Perceptions and processes influencing the transition of medical students from pre-clinical to clinical training." BMC Medical Education, vol. 20, no. 1, August 2020. http://dx.doi.org/10.1186/s12909-020-02186-2.

[11] Hasan, Muniba Mehmood *et al.* "Frequency of musculoskeletal pain and associated factors among undergraduate students." Case Reports in Clinical Medicine, vol. 07, no. 02, 2018, pp. 131-145. http://dx.doi.org/10.4236/crcm.2018.72011.

[12] Alnaimat, F. *et al.* "Fibromyalgia among medical students, a cross-sectional survey using the 2016 acr fibromyalgia criteria." February 2024. http://dx.doi.org/10.47316/cajmhe.2023.4.4.05.

[13] Abumohssin, Abdulelah G. *et al.* "Association between musculoskeletal pain and studying hours among medical students in Jeddah, Saudi Arabia." Cureus, vol. 15, no. 9, September 2023. http://dx.doi.org/10.7759/cureus.45158.

[14] Mangerud, Wenche L. *et al.* "Chronic pain and pain-related disability across psychiatric disorders in a clinical adolescent sample." BMC Psychiatry, vol. 13, no. 1, October 2013. http://dx.doi.org/10.1186/1471-244x-13-272.

[15] Wijnhoven, Hanneke A.H. *et al.* "Prevalence of musculoskeletal disorders is systematically higher in women than in men." The Clinical Journal of Pain, vol. 22, no. 8, October 2006. http://dx.doi.org/10.1097/01.ajp.0000210912.95664.53.

[16] Alshagga, Mustafa Ahmed *et al.* "Prevalence and factors associated with neck, shoulder and low back pains among medical students in a Malaysian medical college." BMC Research Notes, vol. 6, no. 1, July 2013. http://dx.doi.org/10.1186/1756-0500-6-244.

[17] "Musculoskeletal pain and its association with school bag weight and diet intake: A cross-sectional study among school-going adolescents in delhi." Indian Journal of Public Health Research & Development, vol. 11, no. 11, November 2020. http://dx.doi.org/10.37506/ijphrd.v11i11.11374.

[18] Khan, Saad A, and Kwai Yee Chew. "Effect of working characteristics and taught ergonomics on the prevalence of musculoskeletal disorders amongst dental students." BMC Musculoskeletal Disorders, vol. 14, no. 1, April 2013. http://dx.doi.org/10.1186/1471-2474-14-118.

[19] Gomes, Isabela de Paiva *et al.* "Musculoskeletal pain in medical students subject to remote teaching during the COVID-19 pandemic." Journal of Biosciences and Medicines, vol. 09, no. 08, 2021. http://dx.doi.org/10.4236/jbm.2021.98008.

[20] Malmborg, Julia S. *et al.* "Worse health status, sleeping problems, and anxiety in 16-year-old students are associated with chronic musculoskeletal pain at three-year follow-up." BMC Public Health, vol. 19, no. 1, November 2019. http://dx.doi.org/10.1186/s12889-019-7955-y.Reference Two